

Recommended Projects to Protect Businesses and Infrastructure from Flooding

Brattleboro, VT
Vermont Economic Resiliency Initiative (VERI)
January, 2015



















Legend

Effective

Limited

Ineffective

* Priority rating based on objectives and potential business impact

				OBJECTIVES			FEASIBILITY			Comments
Project	What is At Risk?	Potential Business Impacts	Priority*	Reduces Flood Risk ¹	Reduces Erosion Risk ²	Protects Businesses, Infrastructure, and Property	Ease of Implementation	Cost Range	Estimated Time for Implementation	
Building and Site Improvements										
Continue to flood proof downtown buildings (see site 17)	Businesses and residences	>60 businesses and 500 employees	Medium				Moderate	<\$10K per building	1-2 years	The downtown has 114 buildings in the floodplain; 10 in the floodway, three of those severely damaged during Tropical Storm Irene; 18 buildings with major damage in the downtown and 29 with minor damage during Tropical Storm Irene. There is a pending project to upgrade the storm water collection in this area.
Flood proof existing buildings in the floodplain (see site 11)	Businesses and residences	Seven town licensed businesses and Melrose Terrace	Low				Moderate	<\$10K per building	1-2 years	This reach has 91 buildings in the floodplain 12 of which are in the Floodway; 12 are recorded as a total loss after T.S. Irene; 21 had ‘major damage’ from Tropical Storm Irene; and nine had ‘minor’ damage from TS Irene for a total of 42 damaged properties in this reach.
Flood proof buildings (see site 7)	Businesses	> 23 town licensed businesses and 100 employees	Low				Moderate	<\$10K per building	1-2 years	This area has 61 buildings in the floodplain; 10 in the floodway; two mobile homes were total losses; 11 buildings had major damage; 15 had minor damage.
Flood proof buildings (see site 3)	Businesses	7 town licensed businesses and 30 employees	Low				Moderate	<\$10K per building	1-2 years	This area has 34 units in the floodplain; 23 in the Floodway; three total losses; nine with major damage; 11 with minor damage.
Channel and Floodplain Management										
Adopt Town Zoning to prohibit new development in fluvial erosion hazard zone and 100 year flood inundation zone	Future business and residential buildings	>125 businesses and 700 employees	High				Difficult	\$10K-\$50K	2-5 years	Protect existing businesses by maintaining flood storage capacity and eliminate damage to future business and residential development by not building in the areas most prone to flood and erosion risk.
Conserve 8 acres of floodplain, upstream of the downtown, accessed during Tropical Storm Irene and remove berm (see site 16)	Downtown businesses and residents	>60 businesses and 500 employees	High				Moderate	>\$200K	2-5 years	There are 43.6 acres of mapped floodplain downtown, 33.6 of which are developed. The remaining ten, on two sites, are locally significant for flood storage that will reduce risks to downstream businesses. This was project #8 in the River Corridor Plan.

¹Reduces Flood Risk - The proposed project/strategy lowers the flood level.

²Reduces Erosion Risk - The proposed project/strategy lessens the vulnerability of a location to erosion.

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Preserve existing undeveloped wetland corridor (see site 1)	West Brattleboro businesses and public safety (police)	VT State Police Barracks; three businesses and Westgate Apartments	Medium	<div></div>	<div></div>	<div></div>	Easy	\$10K-\$50K	1-2 years	Upstream flood storage capacity is critical in the Whetstone Watershed. Not only does this area provide storage for flood waters as they come off the mountain, it also captures large amounts of woody debris, preventing it from causing debris jams downstream. This project was identified in the River Corridor Plan.
Assist Farmer's Market with relocating, conserve parcel and remove berm; stabilize erosion on south bank (see site 12)	Businesses and residences	Farmer's Market; Evergreen Condos; Guilford Road Bridge	Medium	<div></div>	<div></div>	<div></div>	Moderate	\$100K-\$200K	2-5 years	The Farmer's Market is located entirely in the floodway, and the structures are prone to washing out and causing debris jams downstream. The south bank, across from the Farmer's Market, is eroding. Moving to higher ground is the safest and least cost alternative over time and will increase flood storage capacity and reduce erosion on the south bank.
Protect remaining undeveloped floodplain (7 acres south + 5 acres north of Whetstone Brook) (see site 9)	Businesses and residences	> 10 businesses in immediate vicinity and 15 employees; Meadowbrook Road bridge	Medium	<div></div>	<div></div>	<div></div>	Difficult	>\$200K	2-5 years	Maintaining flood storage capacity will reduce potential damages within the reach and downstream. The remaining floodplain is locally significant for flood storage and it will reduce risks to downstream businesses.
Conserve narrow piece on south bank; improve floodplain access on Locke Field (see site 2)	Businesses	16 West Brattleboro businesses, including State Police Barracks	Medium	<div></div>	<div></div>	<div></div>	Easy	\$10K-\$50K	1-2 years	This small, narrow strip of land was not part of the original Locke Field conservation project although it is on the same side of the river. The berms on it inhibit floodplain access to the already conserved land.
Work with businesses to decrease impervious surfaces and install rain gardens/green infrastructure (see site 8)	Businesses	N/A	Low	<div></div>	<div></div>	<div></div>	Easy	\$10K-\$50K/site	1-2 years	Localized flooding during smaller storm events due to a lot of impervious surfaces. Parking lots and storage areas in this confluence area could be re-designed to provide floodplain function during rain events while still being used for parking and storage. This was priority project #6 in the River Corridor Plan.

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Infrastructure Improvements										
Remove channel blocking sediment upstream of the downstream Williams Street Bridge (see site 15)	Town bridge and road; secondary transportation network	>60 businesses and 500 employees	High	<div></div>	<div></div>	<div></div>	Easy	\$10K-\$50K	1-2 years	103' span can adequately pass bankfull+ events (67') if right channel is cleared out. The bridge was closed for a couple of weeks after scour from Tropical Storm Irene undermined the east abutment. Vermont Agency of Transportation bridge inspection on 6/19/14 also recommends removing the gravel and doing other maintenance. Bridge pier and alignment need adjustment to improve sediment transport.
Realign Route 9 bridge or realign the river (see site 5)	State highway and bridge	>30 businesses and 140 employees	High	<div></div>	<div></div>	<div></div>	Moderate	\$100K-\$200K	2-5 years	This bridge is is misaligned and the left bank is eroding and required repair after Tropical Storm Irene. Riprapping the left bank and improving the road/river alignment will avoid future washouts.
Remove sewer and water lines within the river channel at locations throughout the project area (see site 13)	Businesses and residents of Brattleboro	>125 businesses and 700 employees	High	<div></div>	<div></div>	<div></div>	Difficult	>\$25 million	>5 years	Public health and risks to businesses require responsible location of the sanitary sewer and water lines.
Stabilize utility poles along river corridor (see site 14)	Power and communications	>125 businesses and 700 employees	Medium	<div></div>	<div></div>	<div></div>	Easy	\$50K-\$100K	2-5 years	Utility pole in stream channel east of I91 crossing where the road was damaged and the sewer line broke during Tropical Storm Irene.
Public Safety Improvements										
Consider buyout for at risk properties; remove berm (see site 4)	Mountain Home Mobile Home Park	Affordable housing	High	<div></div>	<div></div>	<div></div>	Difficult	>\$400K	>5 years	Maintaining affordable housing units in the floodway and floodplain puts the most vulnerable in harm's way.
Consider buyouts for at risk properties; remove berms (see site 10)	Glen Park Mobile Home Park	Affordable housing	High	<div></div>	<div></div>	<div></div>	Difficult	>\$200K	>5 years	Maintaining affordable housing units in the floodway and floodplain puts the most vulnerable in harm's way. This was priority project #5 in the corridor plan.
Consider buyouts for at risk properties (see site 6)	Mountain Home Mobile Home Park	Affordable housing	High	<div></div>	<div></div>	<div></div>	Difficult	\$100K-\$200K	>5 years	Maintaining affordable housing units in the floodway and floodplain puts the most vulnerable in harm's way. This was priority project #4 in the corridor plan.

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